

REMARKS

Claims 1, and 5-18 are pending. Claim 5 has been canceled. Claims 1 and 17 have been amended. No new matter has been added by way of this amendment. Reconsideration of the application is respectfully requested.

Claims 1, and 5-18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,228,218 to *Takeuchi* et al. in view of U.S. Patent No. 6,287,419 to *Takeuchi* et al. and U.S. Patent No. 2,801,938 to *Iler*. This rejection is respectfully traversed.

U.S. Patent No. 6,228,218 to *Takeuchi* et al. discloses a water-disintegratable cleaning sheet consisting of a fibrous sheet having incorporated therein, a binder of alkylcellulose; an electrolyte, and (a) a copolymer of a polymerizable acid anhydride and other compounds and/or (b) an amino acid (see *Abs.*).

U.S. Patent No. 2,801,938 to *Iler* relates to a processes in which fibrous, cellulosic paper is impregnated with an alkali-stabilized colloidal silica solution and the silica is thereafter irreversibly attached to the fibers of the paper, and is further directed to the treated paper production so produced (see col. 1, lines 15-20).

Generally, colloidal silica is in a most stable state when its pH is in a range of 9 to 10. The object of the cited reference *Iler* is to set pH within a specific range by adding an alkali, such as Na₂O. Here, if pH is equal to or greater than 10.5, the colloidal silica will be gelled.

On the other hand, gelling of colloidal silica in the present application occurs independently from the pH. For instance, example C-3 set forth in Table 3 on page 23 of the specification uses colloidal silica having a pH of 2 to 4. The final product of the present application has a pH in the range of 5.5 to 7.0 due to the aqueous solution infiltrated into the sheet, regardless of the pH of the colloidal silica.

The gelling of colloidal silica as set forth and claimed is achieved by an electrolyte that is at least one compound selected from the group consisting of sodium sulfate, potassium sulfate, zinc sulfate, aluminum sulfate, alum, sodium chloride, calcium chloride, magnesium sulfate, zinc nitrate, potassium chloride, sodium carbonate, sodium hydrogencarbonate, ammonium carbonate, sodium citrate, sodium pyrrolidonecarboxylate, potassium citrate, sodium tartate, potassium tartrate, sodium lactate, sodium succinate, sodium pantothenate, calcium lactate, and sodium laurylsulfate, as set forth in amended claim 1.

More specifically, when colloidal silica is stabilized by its negative charge, ion discharged from the electrolyte cancels the negative charge of the colloidal silica, so that the silica particles are gathered and gelled together. Here, the claimed electrolyte concentration necessary for gelling colloidal silica is at least 0.2% by mass.

“Takeuchi describes a water disintegratable cleaning sheet which is a fibrous sheet, (see abstract). Takeuchi describes the fibers of the fibrous sheet have satisfactory dispersibility in water, namely water-distintegratability, (column 2, lines 48-54). Takeuchi describes the basis weight of the fibers is between 20 to 100 g/square meter, (column 3, lines 1-8). Takeuchi describes a binder which is added to the fiber web alkylcellulose among others, (column 3, lines 15-35). Takeuchi describes electrolyte in the fibrous sheet, (column 3, lines 37-60). Takeuchi differs from the claimed invention because it is silent about the colloidal silica as a gel compound and the length of the fibers.

Takeuchi '419 describes a water decomposable non-woven fabric with fiber lengths of 3-10 mm., (see abstract; column 2, lines 4-18).

Iler describes treating paper products (corresponding to sheets) with silica sol (corresponds to gel), (column 1, lines 15-20). Iler describes treating paper with aqueous stabilized colloidal solutions corresponding to silica gel or sol, (column 2, lines 42-50). Iler describes how the colloidal silica solution as sol or gel, (column 3, lines 20-71).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the fabric with the fiber lengths of 3-10 mm of '419 and the colloidal silica sol or gel of Iler in the water decomposable sheet of Takeuchi of '218 motivated with the expectation that colloidal silica gel or sol of Iler

would improve wet strength properties and still have properties of wiping without decomposing prematurely especially for use as paper towels and blotting, (column 4, lines 43-45) of *Iler*.”

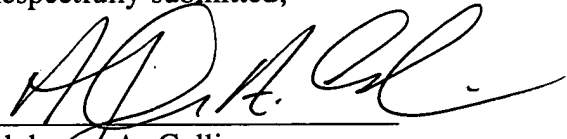
With respect to this prior statement by the Examiner, Applicants wish to point out that although *Iler* teaches the use of a stabilized colloidal silica solution having alkali ions, the gelling mechanism disclosed in this reference is completely different from the gelling mechanism set forth and claimed in the present invention. In view of this difference, Applicants respectfully assert that amended claim 1 is patentable over the cited references, either individually or in combination. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

In light of the patentability of amended independent claim 1, for the reasons above, dependent claims 5-18 are patentable over the prior art.

In light of the foregoing remarks, this application should be in condition for allowance. Early passage of this case to issue is respectfully requested. However, if there are any questions regarding this Response, or the application in general, a telephone call to the undersigned would be appreciated since this would expedite the prosecution of the application for all concerned.

Date: February 26, 2003

Respectfully submitted,


Alphonso A. Collins
Registration No. 43,559
Attorney for Applicant(s)

DARBY & DARBY
805 Third Avenue
New York, New York 10022
(212) 527-7700

COMPLETE SET OF PENDING CLAIMS

1. (Twice Amended) A water-decomposable fibrous sheet in which an aqueous solution is infiltrated, comprising:

water-dispersible fibers having a fiber length of at most 20 mm; and

colloidal silica gelled with an electrolyte contained in the aqueous solution, wherein

a content of the colloidal silica is from 0.25 g to 25 g in terms of silicic acid anhydride, relative to 100 g of the fibers, and a concentration of the electrolyte is at least 0.2% by mass, wherein

the electrolyte is at least one compound selected from the group consisting of sodium sulfate, potassium sulfate, zinc sulfate, aluminum sulfate, alum, sodium chloride, calcium chloride, magnesium sulfate, zinc nitrate, potassium chloride, sodium carbonate, sodium hydrogencarbonate, ammonium carbonate, sodium citrate, sodium pyrrolidonecarboxylate, potassium citrate, sodium tartrate, potassium tartrate, sodium lactate, sodium succinate, sodium pantothenate, calcium lactate, and sodium laurylsulfate.

6. The water-decomposable fibrous sheet as set forth in claim 1, which further contains a binder for binding the fibers to each other.

7. The water-decomposable fibrous sheet as set forth in claim 6, wherein the binder is at least one compound selected from a group consisting of alkyl celluloses, carboxymethyl cellulose, polyvinyl alcohol, modified polyvinyl alcohols, sodium polyacrylate, sodium alginate, polyethylene oxide, starch, and modified starches.

8. The water-decomposable fibrous sheet as set forth in claim 6, wherein a layer containing the binder and the colloidal silica is formed on the surface of a fibrous layer of the water-dispersible fibers.

9. The water-decomposable fibrous sheet as set forth in claim 6, wherein a layer of the binder is formed on the surface of a fibrous layer of the water-dispersible fibers containing the colloidal silica.

10. The water-decomposable fibrous sheet as set forth in claim 6, which contains the colloidal silica and the binder in a fibrous layer of the water-dispersible fibers.

11. The water-decomposable fibrous sheet as set forth in claim 8, wherein the fibrous layer is of a water-decomposable non-woven fabric having been subjected to water-jetting treatment.

12. The water-decomposable fibrous sheet as set forth in claim 9, wherein the fibrous layer is of a water-decomposable non-woven fabric having been subjected to water-jetting treatment.

13. The water-decomposable fibrous sheet as set forth in claim 10, wherein the fibrous layer is of a water-decomposable non-woven fabric having been subjected to water-jetting treatment.

14. The water-decomposable fibrous sheet as set forth in claim 8, wherein the fibrous layer is of a water-decomposable paper having been prepared in a paper-making process.

15. The water-decomposable fibrous sheet as set forth in claim 9, wherein the fibrous layer is of a water-decomposable paper having been prepared in a paper-making process.

16. The water-decomposable fibrous sheet as set forth in claim 10, wherein the fibrous layer is of a water-decomposable paper having been prepared in a paper-making process.

17. (Amended) The water-decomposable fibrous sheet as set forth in claim 1, wherein a weight of the fibers is between a range of 30 to 80 g/m².

18. The water-decomposable fibrous sheet as set forth in claim 1, which has a degree of decomposition in water of at most 200 seconds measured in wet according to JIS P-4501, a strength at break in dry of at least 1400 g/25 mm, and a strength at break in wet of at least 150 g/25 mm.



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072-78

PATENT TRADEMARK OFFICE

Docket No: 2309/OH713

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Naohito TAKEUCHI et al.

Serial No.: 09/675,890

Art Unit: 1771

Confirmation No.: 3384

Filed: September 29, 2000

Examiner: GUARRIELLO, John J.

For: WATER-DECOMPOSABLE FIBROUS SHEET CONTAINING
GEL COMPOUND

MARK-UP FOR AMENDMENT OF FEBRUARY 26, 2003
PURSUANT TO 37 C.F.R. §1.121

Box NON FEE

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

IN THE CLAIMS:

1. (Twice Amended) A water-decomposable fibrous sheet in which an aqueous solution is infiltrated, comprising:

water-dispersible fibers having a fiber length of at most 20 mm[, and a gel compound formed from colloidal particulates and an electrolyte, wherein]; and

[the colloidal particulates are colloidal silica, and] colloidal silica gelled with an electrolyte contained in the aqueous solution, wherein

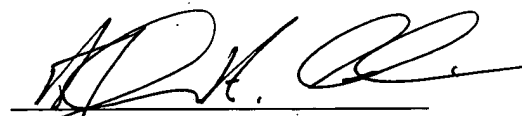
a content of the colloidal silica is from 0.25 g to 25 g in terms of silicic acid anhydride, relative to 100 g of the fibers, and a concentration of the electrolyte is at least 0.2% by mass, wherein

the electrolyte is at least one compound selected from the group consisting of sodium sulfate, potassium sulfate, zinc sulfate, aluminum sulfate, alum, sodium chloride, calcium chloride, magnesium sulfate, zinc nitrate, potassium chloride, sodium carbonate, sodium hydrogencarbonate, ammonium carbonate, sodium citrate, sodium pyrrolidonecarboxylate, potassium citrate, sodium tartrate, potassium tartrate, sodium lactate, sodium succinate, sodium pantothenate, calcium lactate, and sodium laurylsulfate.

17. (Amended) The water-decomposable fibrous sheet as set forth in claim 1, wherein a weight of the fibers [falls from] is between a range of 30 to 80 g/m².

Respectfully submitted,

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